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WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201				
EXAMINER UMEZ ERONINI, LYNETTE T				
ART UNIT			PAPER NUMBER	
1765				

DATE MAILED: 12/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/945,508

Applicant(s)

KO, KEI-YU

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,4-6,9-11,14-16,19,20,65-75,77,78,80,81,83,84 and 86 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-6,9-11,14-16,19,20,65-75,77,78,80,81,83,84 and 86 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/22/04 & 7/26/04.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 66, 75 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (US 5,908,320) in view of Kuehne et al. (US 6,372,605 B1).

As pertaining to claims 1, 66, 75, and 77, Chu teaches, an etchant source gas that includes Ne, CHF<sub>3</sub>, CO, and C<sub>4</sub>F<sub>8</sub> (Abstract), which reads on, an etchant gas composition comprising:

an inert gas (same as carrier gas), (column 6, lines 44-48);

CH<sub>2</sub>F<sub>2</sub> (column 6, lines 55); and  
a gas selected from the group consisting of CHF<sub>3</sub>, CF<sub>4</sub>, and mixtures thereof (column 6, line 44-45).

Chu differs in failing to teach at least one of C<sub>4</sub>F<sub>6</sub>, and C<sub>5</sub>F<sub>8</sub>, in claim 1; C<sub>4</sub>F<sub>6</sub>, in claim 75; and C<sub>5</sub>F<sub>8</sub>, in claim 77.

Kuehne teaches other suitable gases can be substituted for the C<sub>4</sub>F<sub>8</sub>, include (for example and without limitation) C<sub>5</sub>F<sub>8</sub>, C<sub>4</sub>F<sub>6</sub>, or a combination of C<sub>4</sub>F<sub>8</sub> and CH<sub>2</sub>F<sub>2</sub> (column 6, lines 44-52).

Hence, it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu by substituting C<sub>4</sub>F<sub>8</sub> for either C<sub>4</sub>F<sub>6</sub> or C<sub>5</sub>F<sub>8</sub>, because these gases are seen as equivalent as taught by Kuehne (Kuehne, column 6, lines 44-52). Therefore, the combination of Chu and Kuehne would result the same in constituting a boron and/or phosphorus doped silicon dioxide selective to undoped SiO<sub>2</sub> and Si<sub>3</sub>N<sub>4</sub> etchant gas composition as claimed in applicant's invention.

4. Claims 4, 5, and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu ('320) in view of Kuehne ('605 B1), as applied to claim 1, above, and further in view of Kim et al. (US 6,362,109).

Chu in view of Kuehne differs in failing to teach the etchant composition comprises the carrier gas that is selected from the group consisting of argon, helium, and xenon, **in claim 4** and argon **in claim 5**, and comprises O<sub>2</sub>, **in claim 65**.

Kim teaches an etchant comprising a fluorocarbon and oxygen with a flow of an inactive diluent gas such as argon is well known for etching holes in oxide with high aspect ratios, often with a relatively high selectivity to nitride (column 4, lines 43-46).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu in view of Kuehne by employing an etchant that contains oxygen in addition to a fluorocarbon gas and diluent gas, as taught by Kim for the purpose of selectively etching an oxide layer relative to a nitride layer (Kim, column 4, lines 43-46).

Since the body of a claim sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, "A boron and/or phosphorus doped silicon dioxide selective to undoped  $\text{SiO}_2$  and  $\text{Si}_3\text{N}_4$ " etchant gas composition, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999). No patentable weight is given to "a boron and/or phosphorus doped silicon dioxide selective to undoped  $\text{SiO}_2$  and  $\text{Si}_3\text{N}_4$ " in claim 1.

5. Claims 67 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu ('320) in view of Kuehne ('605 B1), as applied to claim 1, above, and further in view of Fayfield et al. (US 6,065,481).

Chu in view of Kuehne differs in failing to teach the carrier gas comprises helium, **in claim 67** and xenon, **in claim 71**.

Fayfield teaches, "... other carrier gases inert to the etching reaction may also be used, for instance the noble gases helium, neon, argon, krypton or xenon (column 6, lines 17-19).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu in view of Kuehne by replacing the carrier gas with either argon, helium, or xenon, as taught by Fayfield for the purpose of diluting the reactive (etchant) gases.

6. Claims 6, 78, and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu ('320) in view of Kuehne ('605 B1).

As pertaining to claims 6, 78, and 80, Chu teaches an etchant gas composition comprising:

an inert gas (same as carrier gas), (column 6, lines 44-48);

$\text{CH}_2\text{F}_2$  (column 6, lines 55); and

a gas selected from the group consisting of  $\text{CHF}_3$ ,  $\text{CF}_4$ , and mixtures thereof (column 6, line 44-45).

Chu differs in failing to teach at least one of  $\text{C}_4\text{F}_6$  and  $\text{C}_5\text{F}_8$ , in claim 6;  $\text{C}_4\text{F}_6$ , in claim 78; and  $\text{C}_5\text{F}_8$ , in claim 80.

Kuehne teaches other suitable gases can be substituted for the  $\text{C}_4\text{F}_8$ , include (for example and without limitation)  $\text{C}_5\text{F}_8$ ,  $\text{C}_4\text{F}_6$ , or a combination of  $\text{C}_4\text{F}_8$  and  $\text{CH}_2\text{F}_2$  (column 6, lines 44-52). Replacing Chu's  $\text{C}_4\text{F}_8$  with Kuehne's  $\text{C}_4\text{F}_6$  or  $\text{C}_5\text{F}_8$  further reads on an

etchant gas composition consisting essentially of: a carrier gas;  $C_4F_6$ ;  $CH_2F_2$ ; and  $CHF_3$ ,  
**in claim 6.**

Hence, it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu by substituting  $C_4F_8$  for either  $C_4F_6$  or  $C_5F_8$ , because these gases are seen as equivalent as taught by Kuehne (Kuehne, column 6, lines 44-52). Therefore, the combination of Chu and Kuehne would result the same in constituting a boron and/or phosphorus doped silicon dioxide selective to undoped  $SiO_2$  and  $Si_3N_4$  etchant gas composition as claimed in applicant's invention.

Since the body of a claim sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, "A boron and/or phosphorus doped silicon dioxide selective to undoped  $SiO_2$  and  $Si_3N_4$ " etchant gas composition, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999). No patentable weight is given to "a boron and/or phosphorus doped silicon dioxide selective to undoped  $SiO_2$  and  $Si_3N_4$ " in claim 6.

7. Claims 9, 10, 68 and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu ('320) in view of Kuehne ('605 B1), as applied to claim 6, above, and further in view of Fayfield ('481).

Chu in view of Kuehne differs in failing to teach the etchant composition comprises the carrier gas that is selected from the group consisting of argon, helium,

and xenon, **in claim 9**; and argon **in claim 10**; helium, **in claim 68**; and xenon, **in claim 72**.

Fayfield teaches, " . . . other carrier gases inert to the etching reaction may also be used, for instance the noble gases helium, neon, argon, krypton or xenon (column 6, lines 17-19).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu in view of Kuehne by replacing the carrier gas with either argon, helium, or xenon, as taught by Fayfield for the purpose of diluting the reactive (etchant) gases.

8. Claims 11, 81, and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu ('320) in view of Kuehne ('605 B1).

As pertaining to claims 11, 81, and 83, Chu teaches an etchant gas composition comprising:

an inert gas (same as carrier gas), (column 6, lines 44-48);

CH<sub>2</sub>F<sub>2</sub> (column 6, lines 55); and

a gas selected from the group consisting of CHF<sub>3</sub>, CF<sub>4</sub>, and mixtures thereof (column 6, line 44-45).

Chu differs in failing to teach at least one of C<sub>4</sub>F<sub>6</sub> and C<sub>5</sub>F<sub>8</sub>, in claim 11; C<sub>4</sub>F<sub>6</sub>, in claim 81; and C<sub>5</sub>F<sub>8</sub>, in claim 83.

Kuehne teaches other suitable gases can be substituted for the C<sub>4</sub>F<sub>8</sub>, include (for example and without limitation) C<sub>5</sub>F<sub>8</sub>, C<sub>4</sub>F<sub>6</sub>, or a combination of C<sub>4</sub>F<sub>8</sub> and CH<sub>2</sub>F<sub>2</sub> (column



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6, lines 44-52). Replacing Chu's  $C_4F_8$  with Kuehne's  $C_4F_6$  or  $C_5F_8$ , reads on an etchant gas composition consisting essentially of: a carrier gas;  $C_4F_6$ ;  $CH_2F_2$ ; and  $CF_4$ , **in claim 11.**

Hence, it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu by substituting  $C_4F_8$  for either  $C_4F_6$  or  $C_5F_8$ , because these gases are seen as equivalent as taught by Kuehne (Kuehne, column 6, lines 44-52). Therefore, the combination of Chu and Kuehne would result the same in constituting a boron and/or phosphorus doped silicon dioxide selective to undoped  $SiO_2$  and  $Si_3N_4$  etchant gas composition as claimed in applicant's invention.

Since the body of a claim sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, "A boron and/or phosphorus doped silicon dioxide selective to undoped  $SiO_2$  and  $Si_3N_4$ " etchant gas composition, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999). No patentable weight is given to "a boron and/or phosphorus doped silicon dioxide selective to undoped  $SiO_2$  and  $Si_3N_4$ " in claim 11.

9. Claims 14, 15, 69, and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu ('320) in view of Kuehne ('605 B1), as applied to claim 11, above, and further in view of Fayfield ('481).

Chu in view of Kuehne differs in failing to teach the etchant composition comprises the carrier gas that is selected from the group consisting of argon, helium, and xenon, **in claim 14**; argon **in claim 15**; helium, **in claim 69**; and xenon, **in claim 73**.

Fayfield teaches, "... other carrier gases inert to the etching reaction may also be used, for instance the noble gases helium, neon, argon, krypton or xenon (column 6, lines 17-19).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu and Kuehne by replacing the carrier gas with either argon, helium, or xenon, as taught by Fayfield for the purpose of diluting the reactive (etchant) gases.

10. Claims 16, 84, and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over ('320) in view of Kuehne ('605 B1).

As pertaining to claims 16, 84, and 86, Chu teaches an etchant gas composition comprising:

an inert gas (same as carrier gas), (column 6, lines 44-48);

CH<sub>2</sub>F<sub>2</sub> (column 6, lines 55); and

a gas selected from the group consisting of CHF<sub>3</sub>, CF<sub>4</sub>, and mixtures thereof (column 6, line 44-45), which further reads on CHF<sub>3</sub> and CF<sub>4</sub>.

Chu differs in failing to teach at least one of C<sub>4</sub>F<sub>6</sub>, C<sub>3</sub>F<sub>6</sub> and C<sub>5</sub>F<sub>8</sub>, in claim 16; C<sub>4</sub>F<sub>6</sub>, in claim 84; and C<sub>5</sub>F<sub>8</sub>, in claim 86;

Kuehne teaches other suitable gases can be substituted for the  $C_4F_8$ , include (for example and without limitation)  $C_5F_8$ ,  $C_4F_6$ , or a combination of  $C_4F_8$  and  $CH_2F_2$  (column 6, lines 44-52). Replacing Chu's  $C_4F_8$  with Kuehne's  $C_4F_6$  or  $C_5F_8$ , reads on an etchant gas composition consisting essentially of: a carrier gas;  $C_4F_6$ ;  $CH_2F_2$ ;  $CHF_3$ ; and  $CF_4$ , in **claim 16**.

Hence, it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu by substituting  $C_4F_8$  for either  $C_4F_6$  or  $C_5F_8$ , because these gases are seen as equivalent as taught by Kuehne (Kuehne, column 6, lines 44-52). Therefore, the combination of Chu and Kuehne would result the same in constituting a boron and/or phosphorus doped silicon dioxide selective to undoped  $SiO_2$  and  $Si_3N_4$  etchant gas composition as claimed in applicant's invention.

Since the body of a claim sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, "A boron and/or phosphorus doped silicon dioxide selective to undoped  $SiO_2$  and  $Si_3N_4$ " etchant gas composition, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999). No patentable weight is given to "a boron and/or phosphorus doped silicon dioxide selective to undoped  $SiO_2$  and  $Si_3N_4$ " in claim 16.

11. Claims 19, 20, 70, and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu ('320) in view of Kuehne ('605 B1), as applied to claim 16, above, and further in view of Fayfield ('481).

Chu in view of Kuehne differs in failing to teach the etchant composition comprises the carrier gas that is selected from the group consisting of argon, helium, and xenon, **in claim 19**; argon, **in claim 20**; argon, **in claim 70**; and xenon, **in claim 74**.

Fayfield teaches, "... other carrier gases inert to the etching reaction may also be used, for instance the noble gases helium, neon, argon, krypton or xenon (column 6, lines 17-19).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu and Kuehne in view Kim of by replacing the carrier gas with either argon, helium, or xenon, as taught by Fayfield for the purpose of diluting the reactive gases.

### ***Response to Arguments***

12. Applicant's arguments filed 11/20/2003 have been fully considered but they are not persuasive. Applicant traverses the rejection of claims 1, 4-6, 9-11, 14-16, 19, 20, 65-75, 77, 78, 80, 81, 83, 84, and 86 over Chu et al. (US 5,908,320) in view of Kuehne et al. (US 6,372,605 B1). Applicant argues the combination of Chu and Kuehne is improper because the of the failure of Chu to disclose an etchant gas composition having at least one of C<sub>4</sub>F<sub>6</sub> and C<sub>5</sub>F<sub>8</sub> in amended-independent claims 1, 6, 11, and 16,

is not remedied by Kuehne, which discloses an etchant gas composition comprising  $\text{CH}_2\text{F}_2$  and  $\text{C}_4\text{F}_6$ , the substitution of  $\text{C}_5\text{F}_8$  for  $\text{C}_4\text{F}_6$ , and the etching silicon dioxide instead of etching doped (boron and/or phosphorus doped) silicon dioxide.

Applicant's argument is unpersuasive because it is acknowledged that Chu fails to teach an etchant gas composition having at least one of  $\text{C}_4\text{F}_6$  and  $\text{C}_5\text{F}_8$ . However, Kuehne teaches other suitable gases can be substituted for the  $\text{C}_4\text{F}_8$ , include (for example and without limitation)  $\text{C}_5\text{F}_8$ ,  $\text{C}_4\text{F}_6$ , or a combination of  $\text{C}_4\text{F}_8$  and  $\text{CH}_2\text{F}_2$  (column 6, lines 44-52). Hence, it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Chu by substituting  $\text{C}_4\text{F}_8$  for either  $\text{C}_4\text{F}_6$  or  $\text{C}_5\text{F}_8$ , because these gases are seen as equivalent as taught by Kuehne (Kuehne, column 6, lines 44-52). Therefore, the combination of Chu and Kuehne would result the same in constituting a boron and/or phosphorus doped silicon dioxide selective to undoped  $\text{SiO}_2$  and  $\text{Si}_3\text{N}_4$  etchant gas composition as claimed in applicant's invention.

### ***Conclusion***

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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November 17, 2004

LANVINH  
PRIMARY EXAMINER

